

15. Ground Contamination

15.1 Introduction

- 15.1.1 This Chapter, which has been prepared by URS, provides a statement of conformity with regard to the potential ground contamination impacts arising from the Scheme with Phase 1A (North) in place (hereafter referred to as 'the Development'). This statement of conformity is provided in respect of the s.73 ES for the purposes of the Development and reviews new baseline information associated with ground investigations in 2014, as well as relevant aspects of detailed design including remediation strategies produced in 2014. The Chapter confirms whether the findings of the s.73 ES with respect to the likely significant effects and mitigation of ground contamination remain valid.
- 15.1.2 The recommendations presented in the Global Remediation Strategy which formed Appendix 13 of the s.73 RDSF are considered to remain valid for the purpose of this assessment. The 'Remediation Strategy: Site Zoning and Sub-Zoning' and the Site Specific Remediation Strategies for Phase 1A (North) which have been prepared by URS to discharge the relevant Planning Conditions (31.1 and 31.2) associated with the 2014 Permission have been reviewed as part of this Chapter.
- 15.1.3 This Chapter is supported by **Appendix 15.1: Remediation Strategy: Site Zoning and Sub-Zoning** and **Appendix 15.2: Site Specific Remediation Strategies** comprising:
- URS, Ground Investigation and Remedial Strategy Report – Phase 1A North Highway Development, Doc. No: 47065005-GE-RPT-011, 17th September 2014 (Revision 1);
 - URS, Ground Investigation and Remedial Strategy Report – Claremont Park, Doc. No: 47065005-GE-RPT-007, 13th August 2014 (Revision 1);
 - URS, Ground Investigation and Remedial Strategy Report – River Brent Diversion, Doc. No: 47065005-GE-RPT-009, 17th September 2014 (Revision 1);
 - URS, Ground Investigation and Remedial Strategy Report – Templehof and Living Bridge and Market Quarter Roads, Doc. No: 47065005-GE-RPT-010, September 2014 (Revision 1)
 - URS, Ground Investigation and Remedial Strategy Report – Plots 53 and 54, Doc. No: 47065005-GE-RPT-006, 13th August 2014 (Revision 1);
 - URS, Ground Investigation and Remedial Strategy Report – Clitterhouse Playing Fields, Doc. No: 47065005-GE-RPT-008, 14th August 2014 (Revision 1); and
 - URS, Remediation Strategy: Site zoning and sub-zoning, Doc No: 47065005-GE-RPT-005, 3rd October 2014 (Revision 2).

15.2 Policy, Legislation and Guidance

- 15.2.1 There has been one potentially material change to guidance since the s.73 ES was prepared, namely the introduction of Category 4 Screening Levels (C4SL) criteria in May 2014ⁱ. A review of relevant material published since October 2013 is set out below indicating the key changes and the effect on the ground contamination assessment where relevant.
- 15.2.2 Following a research study, the Department for Environment, Food & Rural Affairs (Defra) published new criteria for a small range of contaminants in 2014ⁱⁱ. The criteria relate to the boundary between

Category 3 soils and Category 4 soils. The latter are considered to be soils which pose an acceptably low risk of contamination whereas Category 3 soils may pose some risk. In general, the C4SL criteria are higher than the previous Soil Guideline Values (SGV)ⁱⁱⁱ but for lead they are lower for residential scenarios.

- 15.2.3 The C4SL criteria are specifically for use in Part 2A^{iv} investigations, and there is still discussion regarding their use in investigations in a planning context. However, in the context of an industrial / public open space use scenario which has been used for most of the scenarios, the changes in the criteria do not lead to a significant re-assessment of the contaminant conditions. For Plots 53 and 54 in Phase 1A (North) where residential land use is proposed, no previous ground investigation data was available so this was undertaken as part of the 2014 ground investigation works which fed into the SSRs. As such, this has been assessed and reported within this Chapter to supplement the information previously provided in the s.73 ES.

National Planning Policy Guidance

- 15.2.4 Following the introduction of the National Planning Policy Framework (NPPF) in March 2012, the web-based National Planning Practice Guidance has been prepared for Land Affected by Contamination in March 2014^v. The process by which potentially affected land is investigated and assessed, and any mitigation or remediation measures decided, has not been significantly changed by this Practice Guidance.

Draft Further Alterations to the London Plan, 2014

- 15.2.5 The public examination of the draft Further Alterations to the London Plan (FALP)^{vi} commenced on 1st September 2014. There are no implications for ground conditions or contamination in the FALP, and hence there is no impact on the approach of findings of the s.73 ES assessment.

Sustainable Design and Construction Supplementary Planning Guidance, 2014

- 15.2.6 The London Plan Supplementary Planning Guidance (SPG) – Sustainable Design and Construction^{vii} was published in April 2014. There are no implications for ground conditions or contamination in the SPG and hence there is no impact on the approach of findings of the s.73 ES assessment.

15.3 Relevant Phase 1A (North) RMAs Details

- 15.3.1 The detailed design proposals for the Phase 1A (North) RMAs of relevance to ground contamination have been reviewed and are listed below. These elements were assessed as part of the assessment of the Scheme in outline in the s.73 ES, however further consideration is given within this Chapter to the detailed design brought forward via the Phase 1A (North) RMAs to determine whether this has an effect upon the conclusions of the s.73 ES.
- 15.3.2 The elements listed below are each the subject of a Ground Investigation and Remedial Strategy Report prepared by URS to comply with Planning Condition 31.2 of the 2014 Permission.
- **Plots 53 and 54:** Development Plots at Brent Terrace as residential replacement units for the Whitefield Estate housing which will be removed in order to deliver the Living Bridge;

- **Claremont Park:** Improving and modifying the existing park;
- **Clitterhouse Playing Fields:** Improving the existing Playing Fields;
- **River Brent Realignment:** Alteration and diversion of the River Brent;
- **Bridges including replacement Templehof Bridge, the Living Bridge, River Brent bridges and pedestrian and cycle bridge at the M1 junction;**
- **Phase 1A (North) Highway Development:** New roads, junctions and routes to link the future development to the existing infrastructure.

15.3.3 Further descriptions of the Phase 1A (North) RMAs is provided below with a focus on elements of relevance to ground contamination. Although not part of the RMA submission (as full planning permission was granted at the outline stage), for completeness the Gateway Junction works are also included below and in some other parts of this Chapter.

Temporary Bus Station and Bus Stops

15.3.4 The Temporary Bus Station and Bus Stops (Plots 113 and 114) do not have their own specific SSRS report as this is not a requirement for temporary works, however the ground investigation work and assessments undertaken for the Phase 1A (North) Highways Development SSRS (Appendix 15.2) includes the Shopping Centre western estate road, the western roundabout upgrades and connecting roads including Templehof Bridge and Prince Charles Drive which are adjacent to Plots 113 and 114 and therefore are likely to share similar if not the same ground conditions. SSRS reports specifically for Plots 113 and 114 would be provided pre-commencement for Phase 1B and Phase 2. It is therefore considered that the assessment within the Phase 1A (North) Highways SSRS report is suitable to consider in the case of Plots 113 and 114.

Phase 1A North Highway Development

A5/M1/A406 Junction Improvements (Gateway Junction)

- 15.3.5 To note this gateway junction currently has full planning permission through the Section 73 (2014 Permission). As such it is included here not to be reassessed but is included in this Chapter for completeness as the junction falls within the Phase 1A (North) development phase.
- 15.3.6 To the west of the railway arches, the A5/A406 junction is to be remodelled from a roundabout to a signalised junction. This will require, in places, near surface excavations to insert new sections of road construction. None of the excavations will be extensive, and much will be within existing road layers.
- 15.3.7 To the east of the railway arches the existing M1/A406 roundabout junction is to be re-modelled, primarily by inserting two new link roads across the centre of the roundabout, both of which will pass beneath the A406 flyover and also beneath the existing A406 westbound to M1 north link road. This road crosses the roundabout at about grade, and therefore to create the new roads below will require substantial excavation.

Access and Infrastructure for Brent Cross Shopping Centre (includes in part the Gateway Junction for the A406 Brent Cross Ingress/Egress)

- 15.3.8 Improved accesses will be created into the Brent Cross Shopping Centre area from the A406 and also from the east bound off slip on the A406 at the A41 junction. Due to the River Brent re-alignment, there will be seven new bridges over the re-aligned river, and the access road on the southwest side of the Shopping centre will be re-aligned. Likewise there is considerable re-alignment of access roads on the northeast side of the Shopping Centre and a bus station to be constructed to the north of the re-aligned river. Prince Charles Drive will also be re-aligned and the northern approach ramp to the new Templehof Bridge constructed.

A41/A406 Junction (Gateway Junction)

- 15.3.9 A number of improvement works (as approved under the 2014 Permission) will require minor additional earthworks, retaining walls and new foundations.

Templehof and Living Bridges and Market Quarter Roads

- 15.3.10 The Current Templehof Bridge is to be demolished in order to undertake a slight realignment of the bridge. The bridge will be constructed in two phases, in the first phase two thirds of the new bridge will be constructed whilst the current bridge stays open. The new bridge will then open so the final third of the new bridge can be constructed and the old bridge then demolished. The foundations of the new structure will overlap that of the current structure. A new pedestrian 'Living' footbridge is to be constructed over the A406 carriageway.
- 15.3.11 There will be an approach ramp constructed on the southern side of the bridges. It is understood that new residential and commercial units may interface with the edge of these access ramps.
- 15.3.12 There will be improvements to the roads and public realm area to the south of the bridges which will involve the continuation and widening of the Templehof Link Road and Templehof Avenue, construction of a road to the south of the Market Quarter (Market Quarter Road) and a road to link Templehof Avenue, Market Quarter Road and Claremont Way (Claremont Avenue).
- 15.3.13 Further information on the proposed ground levels and the construction of these features can be found with reference to **Appendix 15.2**.
- 15.3.14 The combined cut and fill required for this area of the Development will be approximately 9,740m³ of soils cut with a requirement for approximately 13,180m³ of fill. There will be some areas of soft landscaping such as road verges.
- 15.3.15 Additional highway works for the Gateway Junctions including Cricklewood Lane and the M1/A406 Junction lie within Development Phase 1A (North) however they do not form part of these RMAs as they already have full planning permission through the 2014 Permission. As such these junctions will have their own SSRS reports produced and submitted for discharge by LBB prior to commencement of works to satisfy Planning Condition 31.2. The ground contamination assessment within this Chapter does not therefore reassess these junctions and their SSRS reports are not included in **Appendix 15.2**. The ground contamination for these areas of the Site remains valid as per the s.73 ES.

River Brent Diversion

Channel Design

- 15.3.16 The river is to consist of a three stage channel, designed to meander within its corridor to allow a more natural character to be restored known as Reach 1, 2 and 3. Refer to **Figures 2.9 - 2.11**. Further details of the width of the river corridor is provided in **Chapter 2**.
- 15.3.17 The channel invert will generally be about 5 metres below surrounding ground level with some variation between 3 and 8 metres. A review of geological cross-sections produced along the re-alignment route indicates that the base of the excavation cut for the new three stage channel will lie predominantly in made ground or superficial deposits throughout Reaches 1 and 3 and in London Clay for Reach 2.
- 15.3.18 It is proposed that the diverted channel is lined over at least some of its length to exclude groundwater and prevent potentially contaminated surface groundwater, influencing the quality of the surface water within the River Brent.
- 15.3.19 The proposed channel lining to provide groundwater control (as referred to in 15.3.15) is subject to detailed design and may have to be positioned at both sides of the river corridor and extend into the underlying London Clay. In this way, contaminated groundwater will be totally separated from the river channel. Cross drains will be required across the channel width to allow the free movement of groundwater without disturbing the existing flow regime. The pipes shall have sufficient size to collect and transmit the flow. The exact technical details of the final channel lining design is not a requirement for planning purposes however this will be subject to further assessment post-RMA submission and will be submitted for EA approval prior to construction.
- 15.3.20 For areas where the base of the channel cut into the made ground or superficial deposits a lining will be provided to prevent water being lost from the channel during low flow. Currently the preferred solution is either puddle clay or a High-Density Polyethylene liner although a concrete lined channel is being considered at the upstream and downstream interfaces with the existing channel. Where side-slopes are steep or adjacent to bridges or roads the lining is also likely to be concrete. Substrate is to be introduced to the channel bed to encourage a move to a semi-natural channel. Further details of the design and construction will be subject to approval as part of a Flood Defence Consent process where the Environment Agency is the determining authority.

Landscaping Design

- 15.3.21 The proposed landscaping features are summarised below, as shown in **Figure 2.8**:
- Reed bed planting on low flow and Stage 2 channel and native riparian planting and seeding within Stage 3 channel shape with reed bed planting and native riparian planting
 - Wetland scrapes and backwaters adjacent to the Stage 1 channel (predominantly in Reach 3);
 - A riverside walkway and cycle path along the north bank of the Stage 3 channel; and
 - Naturalised revetment “living walls”.

Clitterhouse Playing Fields

15.3.22 The Clitterhouse Playing Fields Improvements Part 1 will be improved by the introduction of a number of sports pitches and informal playing fields, a multi-use games area (MUGA)/ tennis courts, a play area, a sports pavilion/changing rooms, maintenance store and a car park area. The development plans indicate that re-profiling will result in areas of cut (maximum of 1m) and fill (maximum 0.4m) in areas where new sports pitches are proposed.

Claremont Park

15.3.23 Elements of the proposed development at Claremont Park with relevance to ground contamination include:

- A playground in the south of the site;
- The new levels for the park indicate that there will be some requirement for cut and fill. The new proposed ground levels show that Claremont Park will slope west to east with a reduction in level from approximately 50m AOD to 47m AOD;
- Current ground levels slope east to west towards the middle portion of the park from approximately 47.99m AOD to 45.7m AOD and then slope up towards the south of the site from approximately 45.7m AOD to 53.2m AOD. The changes in ground levels for the proposed development equates to a reduction of approximately 1m in the north, middle portion and southeast of the site with an increase in level of approximately 4m in the south west of the park; and
- Footpaths and areas of vegetation.

Plots 53 and 54

15.3.24 The proposal is for the provision of 47 new homes to relocate the residents of the Whitefield Estate, who will be displaced in order to deliver the Living Bridge and other road infrastructure in Phase 1A (North). There will be 30 units on Plot 53 (six houses and 24 flats) and 17 units on site 54 (five houses and 12 flats), comprising three main buildings, two on plot 53 and one on plot 54 which have townhouses located on either end.

15.3.25 No basements are proposed for the development of these plots. Other features of the proposed development include:

- Residential use to frontages at ground floor and upper floor with a mixture of private gardens and shared amenities space; and
- Car parking space, bike and bin stores which will be at the current ground level of Brent Terrace in the centre of each plot, south of plot 53 and at either end of plot 54.

15.4 Assessment Methodology

15.4.1 There has been no significant changes to planning policy, legislation or guidance which materially affects the approach to the ground contamination assessment presented in s.73 ES. The methodology and significance criteria presented in the s.73 ES Water Resources and Flood Risk Chapter therefore remain valid.

15.4.2 The baseline ground conditions information presented in the s.73 ES has been reviewed by URS in light of further ground investigation work undertaken in 2014 to determine whether the further information could affect the findings of the s.73 ES. During the period March – June 2014, further ground investigations were conducted on the Site. These investigations covered the whole of the Phase 1 Development area, with a particular focus on the Phase 1A (North) infrastructure development sites. The investigations covered both geotechnical and contamination aspects. The detailed scope of the ground investigation undertaken in 2014 is set out in the Structural Soils Factual Report (October 2014^{viii}) and summarised in the relevant Phase 1A (North) a Ground Investigation and Remedial Strategy Reports (**Appendix 15.2**) and is summarised below:

- 15 Cable Percussion Only Boreholes;
- 81 Cable Percussion Boreholes (63No. of which were extended by rotary drilling);
- 1 Rotary Only Borehole;
- 111 Windowless Sample Boreholes;
- 26 Hand Dug Trial Pits;
- 33 Machine Dug Trial Pits;
- 7 Observation Pits;
- 30 Cone Penetration Tests;
- 87 50mm diameter gas/groundwater monitoring standpipes;
- 6 rounds of ground-gas and groundwater level monitoring;
- 1 round of groundwater sampling and chemical testing (60No.); and
- 247 soil contamination tests.

15.4.3 Borehole locations are shown on **Figures 15.1 to 15.8**. The likely significant ground condition impacts arising from the Development with Phase 1A (North) RMAs in place have been reviewed with reference to **Appendix 15.1 and 15.2** and to address Planning Conditions 31.1 and 31.2 of the 2014 Permission.

15.4.4 Planning Condition 31.1 is a Pre-RMA condition and states:

“No Reserved Matters Application shall be submitted in relation to any part of Phase 1 (North) or Phase 1 (South) and/or Phase 2 (North) or Phase 2 (South) (as the case may be) or in relation to any other Phase and no works shall be carried out pursuant to this Planning Permission unless and until details of proposed Remediation Zones or Sub-Zones for the relevant Phase or Sub-Phase along with schedules of earthworks and soil treatment activities relevant to each Remediation Zone or Sub-Zone covering or comprising such Phase or Sub-Phase shall have been submitted to and approved by the LPA. No Development shall be commenced on any subsequent Phase or Sub Phase, unless and until the locations of the Remediation Zones or Sub Zones relevant to such Phase or Sub Phase shall have been reviewed, and details of such review have been submitted to and approved by the LPA in accordance with this condition and the Global Remediation Strategy and the relevant Site Specific Remediation Strategy.”

15.4.5 Condition 31.2 is a pre-commencement condition and states:

“No Remediation Works shall take place within any Phase or Sub-Phase unless and until a Site Specific Remediation Strategy (SSRS) has been prepared, submitted and approved by the LPA for the relevant Remediation Zone or Sub-Zone containing that Phase or Sub Phase. This should set out how the relevant Remediation Zone or Sub-Zone or (if appropriate) that Phase Sub-Phase or Plot will be remediated to a condition suitable for the intended use by removing unacceptable risks to human health, buildings and other property and the natural and historic environment. The SSRS shall be in accordance with the parameters and principles described in the Global Remediation Strategy (provided as Annex 13 to the DSF) and shall include the following details:

- a) chemical and physical criteria for soils and other infill materials to define the acceptability of materials for their intended use on the site;*
- b) sufficient ground investigation data to assess the risks to human health and controlled waters from potential hazards at the site associated with soil and ground water contamination or ground gases, taking into account the proposed land uses and required earthworks;*
- c) a source-pathway-receptor human health environmental risk assessment undertaken using the Contaminated Land Exposure Assessment methodology or successor national guidance, agreed by the LPA as being appropriate at the time such risk assessment is undertaken;*
- d) an environmental risk assessment using national guidance, agreed by the LPA, for the protection of asphyxiation and explosive risks in buildings and the health of plants used in the final development;*
- e) a detailed controlled waters risk assessment, using methods agreed by the LPA (in consultation with the Environment Agency), which includes analytical modelling for the protection of water quality in the River Brent taking account of ground hydraulics applicable to the re-aligned river;*
- f) a description of any remediation works and programme that are necessary to be undertaken in advance of, or during, the construction works to render the land suitable for its intended uses;*
- g) appropriate proposals for the management of any cross-boundary movement of contaminants, in ground water or otherwise, into or out of the Remediation Zone;*
- h) details of the proposed content of the Remediation Validation report and any monitoring to be provided (including longer term monitoring of pollutant linkages), maintenance measures and arrangements for contingency action; and*
- i) a detailed programme for any remediation works, method statements, verification and validation programme and proposed environmental mitigation and monitoring measures to be employed.*

Each SSRS must ensure that the site will not qualify as contaminated land under Part 2A of the Environmental Protection Act 1990 in relation to the intended use of the land after remediation.”

15.4.6 In response to the above planning conditions following the ground investigation, a series of Site Specific Remediation Strategies (SSRS) were developed for various elements of the Phase 1A (North) Development (see **Appendix 15.2**). These areas are listed below:

- Templehof and Living Bridges, and Market Quarter Roads;
- Other Phase 1A (North) Highway Development;

- River Brent Diversion;
 - Clitterhouse Playing Fields;
 - Claremont Park; and
 - Plots 53 and 54.
- 15.4.7 These SSRS took into account the principles outlined in the Global Remedial Strategy (Appendix 13 of the RDSF as submitted with the s.73 Application).
- 15.4.8 The ground contamination assessment methodology used within the SSRS is identical to that contained within the s.73 ES (Section 15.4 and 15.5). Additional information for the assessment was provided by the 2014 ground investigation, but the assessments contained within the SSRS and this document, also take into account all previous information collected for the Site. The significance criteria used within this assessment is identical to that used within the s.73 ES (section 15.10).
- 15.4.9 The proposed remediation as contained within the SSRS reports (**Appendix 15.2**) is committed works which have been incorporated into the detailed design of Phase 1A (North) and as such is now considered to be inherent mitigation for the Development. Therefore, within this Chapter and as a variation from the s.73 ES Chapter, the potential impacts are considered to account for the remediation strategies for Phase 1A (North) as an inherent part of the Development. The mitigation section therefore only considers the need for measures beyond those set out in the SSRS which are recommended for the Development. The potential for significant environmental impacts to arise as a result of the SSRS which were not identified in the s.73 ES has also been considered in this Chapter.

Limitations or Constraints

- 15.4.10 No limitations or constraints were identified within the assessment.

15.5 Consultation

- 15.5.1 The approach to the ground conditions section of this Further Information Report was set out in the EIA Scoping Report (**Appendix 4.1**). LBB requested that if the Global Remediation Strategy and the SSRS are not available prior to submission of the RMAs it should be made clear how these limitations / assumptions are being incorporated into the conclusions. The Global Remediation Strategy was published as Appendix 13 of the RDSF for the Section 73 Application and remains valid. The Remediation Strategy: Site Zoning and Sub-Zoning report and the SSRS have since been made available and are referred to within this Chapter and appended at **Appendix 15.1** and **15.2** respectively.
- 15.5.2 Comments received on ground conditions from LBB and the Environment Agency as part of the December 2014 Scoping Opinion are presented in **Table 4.1** together with responses. Comments are addressed within the Chapter, where appropriate.
- 15.5.3 Prior to the preparation of the SSRS, their scope and format were discussed and agreed with the LBB Environmental Health Officer (EHO). Each SSRS, on completion, has also been sent to the LBB EHO for their comment and agreement.

15.6 Baseline Conditions

- 15.6.1 The s.73 ES was based on a variety of information sources including a desk study, previous investigation and validation reports and site specific investigations undertaken by Scott Wilson in 2007^{ix}. A s.73 Supplementary Phase 1 Geo-Environmental Assessment and Geotechnical Report prepared by URS also accompanied the s.73 Application (Document reference BXC17).
- 15.6.2 The baseline information presented in the s.73 ES Ground Contamination Chapter has been reviewed, taking into account the results of the 2014 ground investigation, remediation strategies now available (**Appendix 15.1** and **15.2**) and detailed design information for the Phase 1A (North) RMAs. An overview of the baseline information now available as a result of the 2014 ground investigation is provided below, although full details can be found in **Appendix 15.2**.
- 15.6.3 The planning for the 2014 ground investigation involved a review of the planned Phase 1A (North) RMAs, a review of the previous investigations results and a gap analysis, to identify proposed exploratory hole locations and testing regimes such that gaps in spatial coverage or test results could be rectified. The scope of the 2014 ground investigations was agreed with LBB and the extent of the coverage is shown in **Figures 15.1-15.8** and in Appendix B of each SSRS report included in **Appendix 15.2**.
- 15.6.4 The 2014 ground investigation results revealed ground, groundwater and contamination conditions consistent with those identified during previous investigations reported in the s.73 ES. A summary of the findings with reference to each of the baseline conditions headings in the s.73 ES is provided in **Table 15.1** below.

Table 15.1: Additional information on baseline conditions of Phase 1A (North) as per the 2014 ground investigations

Baseline Category	Phase 1A (North) Highways	Bridges	River Brent Diversion	Clitterhouse Playing Fields	Claremont Park	Plots 53 and 54
Geological Setting	<p>The sequence of strata comprised made ground, alluvial deposits, River Terrace Gravels and London Clay. The thickness of made ground was recorded as follows:</p> <ul style="list-style-type: none"> -A5/M1 Junction: 0.6 to 11m (thickest in the M1 roundabout); -Brent Cross Shopping Centre Roads: 0.2 to 5.2; and -A41 Junction: 0.5 to 6.7m 	<p>The sequence of strata encountered comprised made ground, alluvial deposits, River Terrace Gravels, London Clay, Harwich Formation, Lambeth Group, Upnor Group, Thanet Sand and Bullhead Beds. Made ground was encountered across the site at a thickness between 0.4 and 6m depth)</p>	<p>The sequence of strata comprised made ground, alluvial deposits, River Terrace Gravels and London Clay. Made ground was encountered up to 7m thick (former Brent Reservoir) but was generally 1 to 2m thick.</p>	<p>The sequence of strata comprised made ground, alluvial deposits and London Clay. Generally, a thin layer of made ground was encountered across the playing fields underlying grass.</p>	<p>The sequence of strata comprised made ground overlying London Clay. Made ground was encountered up to 4.3m thick in the northern end of the site and reduced towards the south of the site (0.15 to 0.4m thick).</p>	<p>The sequence of strata comprised made ground overlying London Clay. Made ground was recorded at a consistent thickness of 0.3 to 0.4m across the site.</p>
Hydrogeology and Hydrology	<ul style="list-style-type: none"> -A5/M1 Junction: In the vicinity of the A5 Junction groundwater depth was c. 3.0m. In the vicinity of the adjacent M1 roundabout groundwater was generally encountered between 1.5 and 3.0m depth. -Brent Cross Shopping Centre Roads: to the west of the site groundwater levels ranged between 0.0 and 2.5m deep whilst to the east of the site levels were between 1.5 and 4.4m deep. 	<p>Groundwater was encountered at depths between 0.97 and 6.87m. The levels indicated that there is an apparent groundwater gradient to the north and north-west (towards the River Brent valley).</p>	<p>Groundwater was normally encountered within the made ground and alluvial deposits at levels between 34.20m and 42.1m AOD. A review of the groundwater levels indicated that groundwater flow appears to be inwards towards the existing river channel.</p>	<p>Groundwater was encountered at depths between 0.41 and 1.46m in alluvial deposits and was observed to be perched on the London Clay with a discontinuous flow.</p>	<p>Groundwater was normally encountered within the made ground/ weathered London Clay at depths between 0.58 and 3.36m.</p>	<p>Groundwater was encountered periodically in one of the two monitoring installations within the London Clay (0.91 to 1.49m depth). Groundwater was not encountered within the remaining three borehole locations during drilling.</p>

Baseline Category	Phase 1A (North) Highways	Bridges	River Brent Diversion	Clitterhouse Playing Fields	Claremont Park	Plots 53 and 54
	-A41 Junction: groundwater was recorded between 0.07 and 1.5m deep to the north-east of the junction and at approximately 1.5m deep to the south-west.					
Current Potentially Contaminative Site Uses	The current potentially contaminative site uses identified in the s.73 ES have been reviewed and remain valid.					
Historic Site Uses	No further information is available on historical site uses.					
Regulatory Inquiries	No further information is available beyond that presented in the s.73 ES which is considered to remain valid.					
Potentially Contaminative Sources	No further information is available beyond that presented in the s.73 ES which is considered to remain valid.					

Source Areas Identified – Supporting SI data (Soils)

Phase 1A (North) Highways

- 15.6.5 Based on the result of about 130 sets of tests, in general the extent of contamination, when compared with human health industrial/commercial criteria was not significant. There were a small number of exceedances for Poly-Aromatic Hydrocarbons (PAHs) (benzo(a)pyrene, benzo(a)anthracene and naphthalene) and for some individual metals (lead and cadmium). The results are consistent with the previous investigations assessed in the s.73 ES.

Phase 1A (North) Bridges

- 15.6.6 The relevant SSRS indicated there was one exceedance for lead above the human health guideline value for commercial/industrial land use in a sample collected at the southern end of the new Templehof Avenue. There were no exceedances recorded for organic contaminants. The results are consistent with the previous investigations assessed in the s.73 ES.
- 15.6.7 Asbestos was detected at four locations south of the North Circular Road. Asbestos Containing Material (ACM) was detected as fibres/small insulation fragment within the soil at a value exceeding the Dutch Intervention Value (Soil Remediation Circular, 2009) of 0.01%.

River Brent Diversion

- 15.6.8 Concentrations of all metals with the exception of lead in one sample of made ground were well below public open space guideline values in all samples tested. Concentrations of PAHs benzo(a)pyrene and dibenzo(ah)anthracene were recorded above the guideline values in four out of 45No. samples of made ground. Concentrations of all other tested organics (TPH and volatile organic compounds) were well below guideline values and in most cases below laboratory detection limits. The results are consistent with the previous investigations assessed in the s.73 ES.

Clitterhouse Playing Fields

- 15.6.9 A total of 20No soil samples collected from the boreholes, as shown on **Figure 15.7**, were analysed. Soil results were compared with corresponding public open space guideline values and the results showed that concentrations of metals and organics were well below relevant criteria in all samples analysed. In addition, volatile organic compounds and speciated TPH were below detection limits in all samples. The results are consistent with the previous investigations assessed in the s.73 ES.

Claremont Park

- 15.6.10 The SSRS revealed there were no exceedances of the public open space guideline values for metals, PAH, TPH or other organic/ inorganic compounds. The results are consistent with the previous investigations assessed in the s.73 ES. Borehole locations for Claremont Park are shown on **Figure 15.7**.

Plots 53 and 54

15.6.11 There were no exceedances of the generic assessment criteria protective of human health for residential with plant uptake or public open space scenarios. There was no asbestos detected in the soil samples analysed. No previous boreholes have been located either on or in the near vicinity of Plots 53 and 54. Borehole locations for Plots 53 and 54 are shown on **Figure 15.8**.

Temporary Bus Station and Bus Stops

15.6.12 As discussed in **Section 15.3**, the Temporary Bus Station and Bus Stops do not have their own SSRS report showing specific baseline results for Plots 113 and 114, however the plots have been included in the site-wide ground contamination assessment as presented in the s.73 ES. As such, the baseline conditions are deemed to remain valid as per the s.73 ES Chapter 15 and will be comparable to those reported in the Phase 1A (North) Highways SSRS report in **Appendix 15.2**.

Source Area Identified – Supporting SI data (Controlled Waters)

Phase 1A (North) Highways

- 15.6.13 In the relevant SSRS groundwater sampling data from approximately 40 standpipe installations across the infrastructure area (both previous investigations and the most recent investigation in Match 2014) was assessed. The results indicated that near surface groundwater (within the made ground or alluvial/gravel deposits) has widespread but generally low level and sporadic metal contamination when compared with Environmental Quality Standard (EQS) levels, occasional areas of PAH contamination and occasional hotspots of contamination where samples recorded metal, PAH and TPH contamination.
- 15.6.14 The metal contamination is mainly manifested by the concentrations of copper which vary from below 1µg/l (the Environmental Quality Standard level) to 90µg/l (in SS01/SW2 on southern side of the existing Brent Cross shopping centre). Other metals which recorded concentrations above Environmental Quality Standard (EQS) were zinc (in 9 samples), boron (in 4 samples) and lead (3 samples).
- 15.6.15 PAH contamination occurred in fewer groundwater samples. Individual PAH speciation's which exceeded EQS criteria on at least one occasion included Fluoranthene, Anthracene, Benzo(a)pyrene and Naphthalene.
- 15.6.16 Data from BH473 on the south side of Tilling Road (in the former gas works area) indicated the worst groundwater conditions, with elevated levels of some TPH bandings, BTEX, Anthracene and Fluoranthene.
- 15.6.17 There were two exceedances of the EQS for TPH in the groundwater samples analysed from locations in the south west area of the Market Quarter Area.
- 15.6.18 The groundwater results are generally consistent with the previous investigations assessed in the s.73 ES.

Phase 1A (North) Bridges

- 15.6.19 The SSRS for Templehof Bridge and the Living Bridge indicated there were exceedances of the EQS guideline values for a number of metals and sulphate present across the site.
- 15.6.20 Exceedances for benzene and PAH were limited to those boreholes located in the south of the site in the area of the proposed Plot 18, borehole BH608 (located on a former petrol station), WS635, WS639 in the area of proposed Plot 12 and Plot 13 for which former uses have included a depot and Claremont Industrial Estate and WS641 located on proposed Plot 25 which former uses have included a shooting ground and Claremont Industrial Estate.
- 15.6.21 These locations are not within the bounds of the proposed infrastructure improvements but do provide information on groundwater elevation and the potential for impacted groundwater to be encountered during excavations as a result of migration from impacted areas of other nearby development plots.
- 15.6.22 Analysis of groundwater was undertaken in a limited number of exploratory holes in the previous investigations assessed in the s.73 ES. No unexpected groundwater contamination conditions were encountered in the 2014 investigation.

River Brent Diversion

- 15.6.23 As part of the SSRS for the River Brent Diversion, statistical analysis of the groundwater data was undertaken. The results suggest that copper and zinc and to a lesser extent nickel, PAHs and phenols in groundwater pose risks to aquatic life. The magnitude of exceedances for metals and PAHs reported in the 2014 ground investigation were generally low in comparison with EQS and DWS and concentrations of TPH were generally recorded below laboratory detection limits. Relatively high concentrations of copper reported in the previous ground investigation data were not observed in the current results, although testing was not conducted in the same areas.

Clitterhouse Playing Fields

- 15.6.24 The analysis of the one groundwater sample collected in the 2014 ground investigation did not detect metals concentrations above the EQS or Drinking Water Standard (DWS) guidelines.
- 15.6.25 For organic analytes, several individual PAHs were recorded above the corresponding EQS and DWS guidelines. Concentrations of hydrocarbons and BTEX were generally detected below laboratory detection limits and were below the adopted criterion.

Claremont Park

- 15.6.26 In the 2014 ground investigation there were exceedances above the relevant EQS guideline values for arsenic and zinc and sulphate in several samples. No exceedances for PAH, TPH or other organic/inorganic compounds were recorded. No groundwater testing was conducted in the previous ground investigation data assessed in the s.73 ES.

Plots 53 and 54

- 15.6.27 During the 2014 ground investigation, groundwater was not encountered during the sampling round in the standpipes installed within WS656 or WS654.

Source Area Identified – Supporting SI data (Ground Gas Conditions)

Phase 1A (North) Highways

- 15.6.28 The SSRS for Highways reported that a maximum Gas Screening Value (GSV) for the site would be 0.035. This was primarily based on the carbon dioxide concentrations from WS645 (maximum of 5.2-8.8%) and the gas flow records from WS 6114 (0.4l/hr on one occasion). This GSV would place the site in Characteristic Situation 1, for which no gas protective measures for buildings would be applicable.
- 15.6.29 The results of the previous ground-gas monitoring data assessed in the s.73 ES also placed the site in a Characteristic Situation 1.

Phase 1A (North) Bridges

- 15.6.30 The SSRS for this zone reported that based on the results of ground gas monitoring, and focussing on the more recent rounds of monitoring post the 2014 investigation, it is considered that a maximum GSV for the site would be 0.01. This is primarily based on the carbon dioxide concentrations from WS626 (7.6%) and WS623 (6.5%).
- 15.6.31 This GSV would place the site in Characteristic Situation 1 (very low risk) although considering that the much of the site was an historic landfill and there were carbon dioxide concentrations of up to 11% (in the previous Structural Soils 2006 investigation), the site should be considered as Characteristic Situation 2 low risk.
- 15.6.32 The 2014 ground-gas results were generally consistent with the previous data assessed in the s.73 ES.

River Brent Diversion

- 15.6.33 The SSRS for the River Brent Diversion reported that a maximum GSV for the site would be 0.0114. This was primarily based on the carbon dioxide concentrations from BH430 (maximum of 5.7%) and the 0.2 L/hr gas flow record from SS02/BH105 (monitored during the previous GI by Structural soils in 2006).
- 15.6.34 This GSV would place the site in Characteristic Situation 1 (very low risk), for which there is no requirement for gas protective measures in buildings. Since no buildings are proposed as part of the River Brent realignment development, gas protection measures are not considered applicable.
- 15.6.35 The results of the previous ground-gas monitoring data assessed in the s.73 ES also placed the site in a Characteristic Situation 1.

Clitterhouse Playing Fields

- 15.6.36 The SSRS for Clitterhouse Playing Fields stated that based on the results of the 2014 investigation ground gas monitoring, a maximum Gas Screening Value GSV for the site would be 0.0028. This is primarily based on the carbon dioxide concentrations from WS698 (maximum 2.8%) and the 0.0 L/hr gas flow records from all boreholes.

15.6.37 This GSV would place the site in Characteristic Situation 1, for which there is no requirement for gas protective measures in the proposed buildings.

15.6.38 No previous ground-gas monitoring was undertaken for the site.

Claremont Park

15.6.39 The SSRS for Claremont Park reported that the GSV for the site would be a maximum of 0.0088. This was primarily based on the carbon dioxide concentrations from WS631 (maximum 8.8%) and a flow rate of 0.0L/hr recorded in all gas monitoring wells over the six rounds. This GSV would place the site in Characteristic Situation 1 (very low risk).

15.6.40 No previous ground-gas monitoring was undertaken for the site.

Plots 53 and 54

15.6.41 The SSRS for Plots 53 and 54 reported that based on the results of ground gas monitoring it was considered that a maximum GSV for the site would be 0.0008. Methane was not detected during 2014 gas monitoring whilst carbon dioxide was detected at relatively low levels (0.8 %). Based on the GSV for this site gas protective measures are not considered to be required.

15.6.42 No previous ground-gas monitoring was undertaken for the site.

Summary

15.6.43 To summarise, since the 2014 ground investigations did not reveal any unexpected contamination conditions, the baseline conditions presented in the s.73 ES are still considered to be valid with regard to groundwater.

Environmental Risk Assessment

15.6.44 Based on the findings of the 2014 ground investigation, the assessment of environmental risk to existing and future receptors presented in the s.73 ES was reviewed and is considered to remain valid.

15.6.45 The s.73 ES highlighted the need for *“further assessment and investigation at the detailed design stage to allow all significant risks present, and potentially present, at the site to be considered within the context of the final scheme layout and detailed design proposals”*.

15.6.46 The 2014 ground investigation revealed that the baseline conditions identified in the s.73 ES remain valid with regard to soil/groundwater quality and ground-gas for the Phase 1A (North) area. In addition, there have been no significant changes to the detailed design from the outline parameters defined in the s.73 ES. Taking this into consideration, the source-pathway-receptor linkages of the ES remain valid.

15.7 Assessment and Mitigation

15.7.1 As set out within the methodology section of this Chapter, the measures included within the remediation strategies in **Appendix 15.2** have been incorporated into the detailed design for the Phase 1A (North) RMAs and therefore now form inherent mitigation. As such, the SSRS are

considered as an inherent part of the Development and are considered within the Potential Impacts section.

- 15.7.2 The s.73 ES identified a wide range of mitigation measures and noted that in order to define the exact extent and scope of mitigation, further ground investigation work would be required during the detailed design stage of the project. In view of the new 2014 ground investigation data (**Appendix 15.2**) and the subsequent risk assessment, a smaller range of mitigation measures were identified in the SSRS produced for the Phase 1A (North) area. A summary of these remediation measures is provided below.

Site Specific Remediation Strategies

Phase 1A (North) Highways

Future Site Users

- In the vicinity of the A5/A406 junction improvement scheme, areas of soft landscaping will require a minimum of 450mm of clean subsoil and topsoil cover;
- In the vicinity of the M1/A406 junction improvements scheme the cutting slopes are to be covered by a minimum of 450mm of clean subsoil and topsoil;
- In the area south of the M1 junction (formerly a gasworks) it is recommended that soft landscaping areas (e.g. cutting side slopes) are covered with minimum of 600mm of clean subsoil and topsoil;
- In the Brent Cross Shopping Centre area, any minor soft landscaping areas associated with the roads (e.g. grass verges) should be provided with a minimum of 450mm of clean subsoil and topsoil; and
- In the vicinity of the M1/A406 junction improvements scheme, a geo-environmental specialist is required during cutting excavation to view the material being excavated and identify areas that may be contaminated / require treatment.

Phase 1A (North) Bridges

Future Site Users

- 15.7.3 In the Templehof Avenue / Market Quarter Road and Claremont Avenue areas it is recommended that the following remediation measures are adopted:
- A geo-environmental specialist to be on Site during cutting excavation to view the material being excavated, and to identify any areas that may be contaminated/ require treatment;
 - Soil in the southern end of the new Templehof Avenue and southern end of Claremont Avenue has been identified as having potential to contain asbestos and therefore is not suitable for re-use in areas of soft landscaping; and
 - Cutting slopes to be covered by a minimum of 450mm of clean subsoil and topsoil.

Current Site Users (Construction Workers)

- 15.7.4 In the southern end of the new Templehof Avenue and southern end of Claremont Avenue where potential for asbestos containing material (ACM) within soil to be present has been identified, the following precautions should be undertaken to protect construction workers excavating here:
- Additional sampling during excavation to determine areas that will require treatment;
 - Workers should wear the appropriate PPE when excavating (tyvek suits, respiratory protection);
 - Large pieces of asbestos to removed and disposed of by a specialist;
 - Air monitoring undertaken to assess asbestos fibres in breathing zone; and
 - Damping down of areas where potential ACM is identified.

Perched Groundwater (Construction Phase Mitigation)

- 15.7.5 The SSRS stated that ground water treatment was not considered likely to be required but as a precaution, a specialist is to be on site during cutting excavation to view the material being excavated, and to identify any areas that may be contaminated/ require treatment.

River Brent Diversion

- 15.7.6 In the SSRS, existing and new 2014 ground investigation data in the vicinity of the new channel was assessed. For soils, limited exceedances of lead and PAHs above public open space guideline values were recorded however statistical analysis revealed there was no unacceptable risk to human health. Leachable concentrations of metals in soils above EQS values were reported in made ground, posing a potential risk to aquatic life in the new river. However, as part of the channel design the internal slopes will be formed of clean inert material and made ground will not be re-used in the channel.
- 15.7.7 Statistical analysis of the groundwater data suggests that copper and zinc and to a lesser extent nickel, PAHs and phenols in groundwater pose risks to aquatic life. The key potential Controlled Water receptor identified is the existing River Brent. However, the existing river alignment is canalised in a concrete lined channel and is therefore not in hydraulic connectivity with groundwater. The proposed design of the re-aligned river incorporates L-shaped cut-off walls and an impermeable lining on the river base therefore contaminated groundwater will be totally separated from the river channel.
- 15.7.8 Taking the above into consideration, it is not considered that soil or groundwater remediation is required during the new channel construction.

Proposed Construction

- 15.7.9 The excavation for the river is intended to be much wider than the existing river channel, to allow for a more natural-looking river to be developed (within the impermeable membrane/ concrete box). The excavation will be between 15 and 40m wide and typically 5m deep. Excavations will therefore generate large volumes of made ground, Alluvium, River Terrace Gravel and London Clay. The table below provides a summary of the estimated cut and fill earthworks volumes based on data assessed in the River Brent Diversion SSRS.

Estimated Cut and Fill Volumes

Area	Cut			Fill	
	Volume of made ground (m3)	Volume of Alluvium/River Terrace Gravels (m3)	Volume of London Clay (m3)	Total Volume (m3)	Total Volume (m3)
Reach 1 (new)	37,800	10,100	2,500	50,400	28,000
Reach 2 (new)	46,000	19,400	17,000	82,400	40,900
Reach 3 (new)	40,700	7,700	2,500	50,900	36,000
Reach 2 (existing)	-	-	-	-	18,700

Soil and groundwater re-use

- 15.7.10 The channel excavation will generate considerable surplus material. Soils should be separated into made ground and natural soils and characterised accordingly. Where possible it is proposed that the excavated material is re-used onsite either for profiling the new river channel or for fill material for the existing Reach 2 river channel. Furthermore, the London Clay arisings may be suitable for use onsite as a low permeability cover for the channel lining.
- 15.7.11 Surplus materials may be recycled within the wider project either for use in public open space areas or as engineering fill under hardstanding. In addition, the material may be used as fill materials for other construction projects. However, the chemical and geotechnical suitability of the soil material will require further characterisation and approval from the regulatory authorities.
- 15.7.12 Material that is surplus to these requirements can be used in other projects in the area, or as a last resort be disposed of at a licensed landfill site. Pre-treatment of this material should not be required prior to disposal.
- 15.7.13 Significant excavations will be required below groundwater level and engineering measures will be required to manage groundwater during construction including sheet piling to create a cofferdam and/or dewatering during excavation. It is not considered that widespread groundwater remediation is required during the new channel construction.
- 15.7.14 The water quality testing undertaken as part of this investigation suggests that pre-treatment of the shallow groundwater is unlikely to be required prior to disposal. However, the results of the analysis can be used during negotiations with the sewer utility operators when applying for any discharge consents. In accordance with good practice it is recommended that pumped groundwater is passed through a settlement tank with an oil separator prior to discharge into a local foul sewer.

Clitterhouse Playing Fields

- 15.7.15 The SSRS identified no exceedances of contaminants in soil above the relevant guideline values. Elevated concentrations of PAHs were identified in the one groundwater sample obtained however the risk assessment did not identify an unacceptable risk to Controlled Waters based on the site overlying Unproductive Strata and the distance of the nearest surface water receptor. In view of

this, no remediation was recommended. The results of ground-gas monitoring showed that gas protection measures were not required in buildings. Taking this into consideration, no mitigation / remediation measures were identified.

Claremont Park

Future Site Users

15.7.16 The 2014 ground investigation identified a potential for ACM to be present in the north of the site where significant thicknesses of made ground were encountered. Consequently, the SSRS stated that excavated soils from this area during the re-levelling works are not to be re-used in soft landscaping areas.

Plots 53 and 54

15.7.17 The SSRS identified no exceedances of contaminants in soil above the relevant guideline values and no groundwater was detected during the monitoring round. The SSRS concluded that no remediation of soils or groundwater was required for the plots 53 and 54. The results of ground-gas monitoring showed that gas protection measures were not required in buildings.

Construction

Potential Impacts

15.7.18 The Indicative Construction Programme (ICP) and the Construction Impact Assessment Addendum (CIA) set out in the s.73 Application remain unchanged. Therefore the construction activities provided within the s.73 remain applicable.

15.7.19 Following a review of legislation, policy and guidance, baseline and the Phase 1A (North) detailed design, it can be confirmed that the assessment of construction ground contamination impacts presented in the s.73 ES Ground Contamination Chapter remains valid, however with the inclusion of the remediation strategy measures previously considered as mitigation, the former residual impacts have now become the potential impacts for the Development. This is because the remediation strategy is now considered as inherent mitigation in the detailed design of Phase 1A (North), whilst much of the mitigation was previously focussed on further investigations which have now been undertaken to inform the SSRSs.

15.7.20 There have been no significant changes to legislation, policy and guidance which have led to a need for the re-assessment of baseline data since the s.73 ES was prepared; whilst additionally the ICP and CIA remain unchanged. The results of the SSRS outlined above accord with the assumptions made in the assessment of the ground contamination impacts of the Scheme undertaken at outline stage and presented in the s.73 ES.

15.7.21 The s.73 ES identified a wide range of mitigation measures and noted that in order to define the exact extent and scope of mitigation, further ground investigation work would be required during the detailed design stage of the project. In view of the new 2014 ground investigation data and the subsequent risk assessment, a smaller range of mitigation measures were identified in the SSRS produced for the Phase 1A (North) area.

- 15.7.22 The new 2014 ground investigation data and subsequent risk assessment (**Appendix 15.2**) indicated that the potential impacts for the Development remain within the limits of those identified in the s.73 ES. As mentioned above, the mitigation measures in the SSRS are conditioned under the 2014 Permission and therefore have now been incorporated into the detailed design and delivery methods for the Phase 1A (North) area, therefore this is now considered to have become inherent mitigation for the Phase 1A (North) proposals. Following the application of the inherent mitigation through the SSRSs and the standard mitigation through CEMP and CoCP, it is considered that no significant impacts are likely to arise for ground contamination during construction.
- 15.7.23 Although specific ground investigation results and assessment has not been provided within this Chapter and the SSRS reports for the Temporary Bus Station and Bus Stops, it is considered that due to the minor nature of the proposed ground works the impacts will not be significant. Construction works for the Temporary Bus Station and Bus Stop are expected to be minimal, with no deep excavations and / or piling activities anticipated. Changes to the existing car parks will involve new road markings, pavement alterations, new service connections and the installation of bus shelter structures. The Temporary Bus Station offices and welfare facilities will take the form of temporary structures such as porta-cabins for ease of installation and removal after the four years of operation. Alternatively, low impact brick structures may be constructed requiring minimal foundations.
- 15.7.24 The potential construction impacts identified in the s.73 ES included disturbance of contaminated land resulting in damage to watercourses, human health or the environment, unidentified contamination and safety of the workforce. Due to the further refinement of the detailed design proposals and the additional information gained from the 2014 investigations and SSRS, it is considered that the potential construction impacts will be **negligible**. This is consistent with the reported residual construction / short term impacts of the s.73 ES.

Mitigation

- 15.7.25 All relevant mitigation measures from the s.73 ES have now been incorporated into the SSRSs for the Phase 1A (North) areas of the Site. As such, these measures have now formed part of the detailed design and Planning Conditions of the 2014 Permission and are considered to be inherent to the Development.

Residual Impacts

- 15.7.26 No new or different impacts were identified in the SSRS compared with the s.73 ES. Furthermore, no new or different mitigation measures were identified; however the SSRS identify a smaller range of more targeted mitigation measures as noted above which have now become inherent in the detailed design. Taking this into consideration, no new or different residual construction impacts have been identified.

Operation

Potential Impacts

- 15.7.27 A review of the detailed design and landscaping proposals presented in the six SSRS reports for the Phase 1A (North) area is presented in Section 15.3. It is noted that there have been no significant changes to the Scheme since the production of the s.73 ES in terms of deviations from the 2014 Permission parameters and principles (except for minor revisions proposed or approved in accordance with the 2014 Permissions conditions.). The detailed Phase 1A (North) RMAs do not alter the previously identified impacts or proposed mitigation for the Scheme as presented in the s.73 ES.
- 15.7.28 Following a review of legislation, policy and guidance, baseline and the Phase 1A (North) detailed design, it can be confirmed that the assessment of potential operational impacts presented in the s.73 ES Ground Contamination Chapter remains valid. This is because there have been no significant changes to legislation, policy and guidance or to the baseline since the s.73 was prepared; and a review of the Phase 1A (North) detailed design and landscape proposals alongside the results of the Site Specific Remediation Strategies outlined above accord with the assumptions made in the assessment of the ground contamination impacts of the Scheme undertaken at outline stage and presented in the s.73 ES.
- 15.7.29 The remediation strategy is now considered as inherent mitigation in the detailed design of Phase 1A (North). The potential impacts previously reported included contamination of ground water resulting from River Brent concrete channel removal; however this is considered to be adequately controlled and risk eliminated through the detailed design and delivery proposals. In view of this, it is deemed that the potential operational impacts from the detailed design in terms of contamination risks are **negligible**. This is consistent with the reported residual operation / long term impacts of the s.73 ES.

Mitigation

- 15.7.30 No new or different mitigation was identified in the SSRS compared with the s.73 ES. Therefore the operational mitigation measures contained within the s.73 ES remain valid.

Residual Impacts

- 15.7.31 No new or different residual operational impacts are identified compared with those presented in the s.73 ES with the SSRS in place together with other mitigation measures already identified in the s.73 ES.

15.8 Summary

- 15.8.1 No new or different potential impacts, mitigation or residual impacts arising from the Development have been identified in respect of Ground Contamination, and all of these remain as identified in the s.73 ES.

References

- ⁱ CL:AIRE (2013), Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination: Final Project Report.
- ⁱⁱ Defra (2014), SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document.
- ⁱⁱⁱ Environment Agency (2009), Land Contamination: Technical Guidance (Soil Guideline Values).
- ^{iv} Environmental Protection Act (1990), Part 2A Contaminated Land.
- ^v Department for Communities and Local Government (2014), Land Affected by Contamination.
- ^{vi} Greater London Authority (2014); ‘Draft Further Alterations to the London Plan’
- ^{vii} Greater London Authority, (2014); ‘Supplementary Planning Guidance – Sustainable Design and Construction’
- ^{viii} Structural Soils Limited, Factual Report on Ground Investigation at Brent Cross/Cricklewood Regeneration, Report No: 561192, October 2014.
- ^{ix} Scott Wilson Ltd (2007), ‘Brent Cross Cricklewood, Contamination Assessment Report’, ref D111870/GE02/004; ‘Brent Cross Cricklewood, Geotechnical Development Report’, ref D111870/GE02/003; and ‘Brent Cross Cricklewood Phase 1 Desk Study Report’, ref D111870/GE02/001.